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| 10/537,077 | 06/01/2005 | Diego Brita | FE 6085 (US) | 8072 |

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| EXAMINER |
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CHOI, LING SIU

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| ART UNIT | PAPER NUMBER |
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1796

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10/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 10/537,077 | Applicant(s) BRITA ET AL. | |
| | Examiner Ling-Siu Choi | Art Unit 1796 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>07/26/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the Amendment filed July 26, 2007. Claim 14 was canceled and claims 1-13 and 15-28 are now pending. The claims objection and the claim rejections under 35 U.S.C. 102(b) as being anticipated by Ala-Hulkku et al. (EP 0 416 928 A2) are withdrawn and claim rejections under 35 U.S.C. 102(b) as being anticipated by Goeke et al. (EP 0 004 647 A2) are maintained.

Claim Analysis

2. Summary of Claim 1:

| |
|--|
| A solid catalyst component to polymerize olefins comprising |
| Mg, |
| a titanium compound selected from titanium tetrahalides, or of formula $TiX_n(OR^1)_{4-n}$, wherein $0 \leq n \leq 3$, X is halogen, and X^1 is C_{1-10} hydrocarbon group |
| a halogen |
| an electron donor compound(ED): ethers, esters, amines, ketones, or nitriles |
| wherein the molar ratio of $Mg/Ti > 5$ and the molar ratio of $ED/Ti > 3.5$ |

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Summary of Claim 15:

| | |
|---|---|
| A catalyst for the polymerization of olefins comprising a product obtained by contacting | |
| A | <p>a solid catalyst component comprising</p> <p><u>Mg</u>,</p> <p>a <u>titanium compound</u> selected from titanium tetrahalides, or</p> <p style="padding-left: 40px;">of formula $\text{TiX}_n(\text{OR}^1)_{4-n}$, wherein $0 \leq n \leq 3$,</p> <p style="padding-left: 40px;">X is halogen, and X^1 is C_{1-10} hydrocarbon group,</p> <p>a halogen, and</p> <p>an electron donor compound (ED) selected from ethers, esters, amines, ketones,</p> <p style="padding-left: 40px;">or nitriles</p> |
| | wherein the molar ratio of $\text{Mg/Ti} > 5$ and the molar ratio of $\text{ED/Ti} > 3.5$ |
| B | at least one aluminum compound and optionally , |
| C | an external electron donor compound |

Summary of Claim 25:

| | |
|---|---|
| A process of (co)polymerizing olefin in the presence of a catalyst comprising a product obtained by contacting: | |
| A | <p>a solid catalyst component comprising</p> <p><u>Mg</u>,</p> <p>a titanium compound selected from <u>titanium tetrahalides</u>, or</p> <p style="padding-left: 40px;">of formula $\text{TiX}_n(\text{OR}^1)_{4-n}$, wherein $0 \leq n \leq 3$,</p> <p style="padding-left: 40px;">X is halogen, and X^1 is C_{1-10} hydrocarbon group, a halogen,</p> <p>an electron donor compound (ED) selected from ethers, esters, amines, ketones,</p> <p style="padding-left: 40px;">or nitriles</p> |
| | wherein the molar ratio of $\text{Mg/Ti} > 5$ and the molar ratio of $\text{ED/Ti} > 3.5$ |
| B | at least one aluminum compound and optionally, |
| C | an external electron donor compound |

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-13 and 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Goeke et al. (EP 0 004 647 A2).

Goeke et al. disclose a **catalyst** comprising (A) a **precursor** in the formula of $Mg_m Ti_l (OR)_n X_p [ED]_q$ and (B) an activator having the formula of $Al(R'')_c X'_d H_e$; wherein the precursor is the contact product of a titanium compound $[Ti(OR)_a X_b]$, a magnesium compound $[MgX_2]$, and an electron donor, wherein **Mg/Ti = about 0.5-56** (preferably about 1 to 10) and **electron donor/Ti = about 2-85** (preferably about 3 to 10) (page 12-14; claim 1). Goeke et al. further disclose that the electron donor is alkyl esters of aliphatic and aromatic carboxylic acids, aliphatic ethers, cyclic ethers, and aliphatic ketones – tetrahydrofuran and ethyl acetate being exemplified; the activator is $Al(C_2H_5)_3$, $Al(C_2H_5)_2 Cl$, $Al(i-C_4H_9)_3$, $Al(C_6H_{13})_3$, $Al(C_8H_{17})_3$, or mixtures thereof (page 14, lines 1-11 and 27-31; claim 1). Thus, the present claims are anticipated by the disclosure of Goeke et al.

5. Claims 25-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Goeke

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et al. (EP 0 004 647 A2).

Goeke et al. disclose a process to form a copolymer of ethylene and a comonomer in gas phase in the presence of catalyst which comprises (A) a precursor in the formula of $Mg_mTi_l(OR)_nX_p[ED]_q$ and (B) an activator having the formula of $Al(R'')_cX'_dH_e$; wherein the precursor is the contact product of a titanium compound $[Ti(OR)_aX_b]$, a magnesium compound $[MgX_2]$, and an electron donor - **Mg/Ti = about 0.5-56** (preferably about 1 to 10) and **electron donor/Ti = about 2-85** (preferably about 3 to 10); the electron donor is alkyl esters of aliphatic and aromatic carboxylic acids, aliphatic ethers, cyclic ethers, and aliphatic ketones – tetrahydrofuran and ethyl acetate being exemplified; the activator is $Al(C_2H_5)_3$, $Al(C_2H_5)_2Cl$, $Al(i-C_4H_9)_3$, $Al(C_6H_{13})_3$, $Al(C_8H_{17})_3$, or mixtures thereof; the comonomer is C_{3-8} comonomer in an amount of at least 1 to 10 mol % (page 12-14 - especially page 14, lines 1-11 and 27-31; page 19, lines 31-37; page 20, lines 1-30; claim 1). Thus, the present claims are anticipated by the disclosure of Goeke et al.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goeke et al. (EP 0 004 647 A2) in view of Govoni et al. (WO 93/03078).

The disclosure of Goeke et al. is set forth in paragraph 4 and is incorporated herein by reference.

The difference between the present claims and the disclosure of Goeke et al. is the requirement of an external electron donor which is an aliphatic ether or tetrahydrofuran to be used in the present invention.

Govoni et al. disclose a catalyst comprising (A) a solid component comprising a titanium compound containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an **external donor which is the same** or different type **with respect to the internal donor** (pages 6-7). Govoni et al. further disclose that "[t]he external donor is used to confer to the catalyst the required high stereospecificity. However, when particular diethers are employed as internal donors, the catalyst stereospecificity is sufficiently high and no external donor is required" (page 7, lines 15-20). In other words, if the internal electron donor is not diether, an external electron donor is required to obtain the high stereospecificity [*motivation*]. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use tetrahydrofuran as the external electron donor in the disclosure of Goeke et al. to obtain the high stereospecificity and thereby obtain the present invention.

8. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goeke

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et al. (EP 0 004 647 A2) in view of Govoni et al. (WO 93/03078).

The disclosure of Goeke et al. is set forth in paragraph 4 and is incorporated herein by reference.

The difference between the present claim and the disclosure of Goeke et al. is the requirement of the external electron donor to be a specific silicon compound.

Govoni et al. disclose a catalyst comprising (A) a solid component comprising a titanium compound containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an external donor which is the same or different type with respect to the internal donor (pages 6-7). Govoni et al. further disclose that "[w]hen the **internal donor is an ester**.....the external donor is preferably selected from the silicon compounds of the formula $R_1R_2Si(OR)_2$" to obtain the high stereospecificity [motivation] (page 7, lines 15-16; page 16, lines 13-16). In light of such benefit, it would have been obvious to use the specific silicon compound in the disclosure of Goeke et al. to obtain the high stereospecificity and thereby obtain the present invention.

9. Claims 22-24 and 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goeke et al. (EP 0 004 647 A2) in view of Govoni et al. (WO 93/03078).

The disclosure of Goeke et al. is set forth in paragraph 4 and is incorporated herein by reference.

The difference between the present claim and the disclosure of Goeke et al. is the requirement of the catalyst to be pre-polymerized to have the specific amount of the

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polymer.

Govoni et al. disclose a catalyst comprising (A) a solid component comprising a titanium compound containing at least one titanium-halogen bond supported on a magnesium halide in active form and an internal donor, (B) an alkyl aluminum compound, and optionally (C) an external donor which is the same or different type with respect to the internal donor (pages 6-7). Govoni et al. further disclose that the catalyst is undergone pre-polymerization treatment with ethylene and/or alpha-olefin to obtain a prepolymerized catalyst having polymer in an amount from about 1 to about 1,000 g polymer per g of the catalyst (page 25, lines 17-24). The pre-polymerization treatment "allow to control the polymerization process in the gas phase without the drawbacks.... which are essentially due to the low heat transfer capability of the gas phase and to the formation of electrostatic charges, which determine the tendency of the catalyst and the polymer particles to adhere to the reactor walls" [*motivation*] (page 6, lines 7-13). In light of such benefit, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use pre-polymerized catalyst in the disclosure of Goeke et al. to avoid fouling and thereby obtain the present invention.

Response to the Amendment

10. Applicant's arguments filed 07/26/2007 have been fully considered but they are not persuasive.

It is noted that claims 1-13 and 15-24 are drawn to product-by-process claims

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and claims 25-28 are the processes to use the product made according to claims 1-13 and 15-24. The difference between the disclosure of Goeke et al. and the present invention is that Goeke et al. use MgX_2 instead of Mg to react with $Ti(OR)_aX_b$ to produce the solid catalyst component. Since the halogen of the final product can come from the titanium compound which carries halogen, the final product would be substantially the same. Thus, the claim rejections are maintained.

Ala-Hulkku et al. (EP 0 416 928 A2) disclose a catalyst comprising (A) a solid carrier with a magnesium compound, an electron donor compound, and monocyclopentadienyl titanium trichloride on its surface and (B) a cocatalyst which is preferably trialkylaluminum or alkylaluminum halide; wherein the electron donor is an alkyl ester of a carboxylic acid, an aliphatic ester, a cyclic ether, or an aliphatic ketone and tetrahydrofuran is exemplified as the electron donor; $Mg/Ti = 1 - 10$ [$Ti/Mg = 0.1$ to 1.0]; $electron\ donor/Ti = 0.05-4.5$ [$electron\ donor/Mg = electron\ donor/Ti = (0.5-4.5)(0.1-1.0)$] (abstract; page 3, lines 39-51 ; page 4, lines 18-20; page 5, lines 52; claim 5). Ala-Hulkku et al. further disclose that "....procatalyst was suspended in..... pentane andalkyl aluminum was added to it.....The mixture was agitated at room temperature in nitrogen flow for about 20 minutes" (page 5, lines 51-54). However, Ala-Hulkku et al. do not teach or fairly suggest the claimed process, wherein the solid catalyst component is obtained by the contact of Mg with the titanium compound selected from titanium tetrahalides, or of formula $TiX_n(OR^1)_{4-n}$ [$0 \leq n \leq 3$] and an electron donor compound (ED) selected from ethers, esters, amines, ketones, or nitriles.

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Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reach on 571-272-1114.


LING-SUI CHOI
PRIMARY EXAMINER

October 15, 2007